AUG 7 1941

Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

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9th July, 1941.

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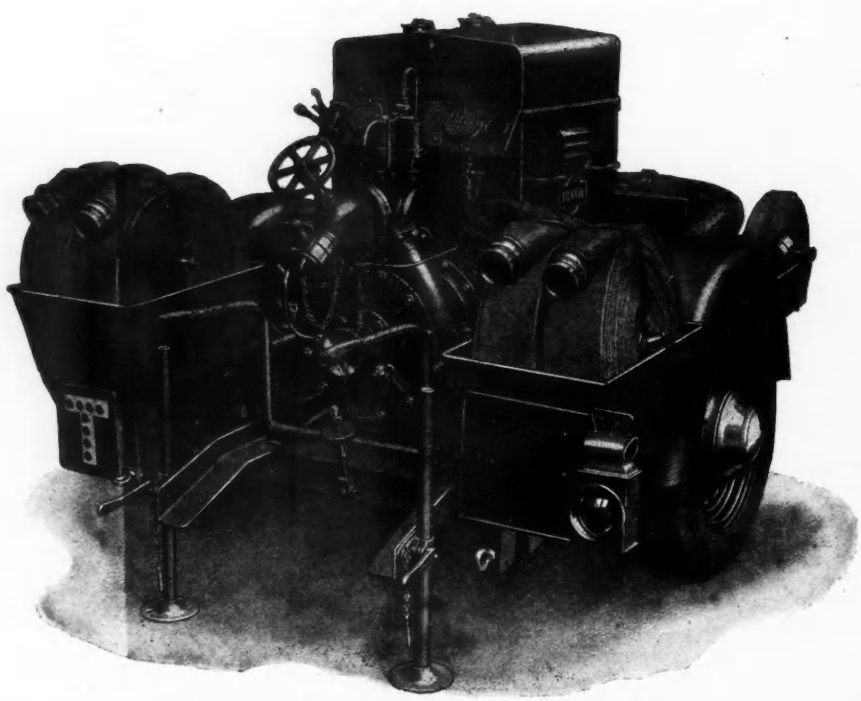

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CONTENTS

EDITORIAL NOTES

Standardization of Coke 55

And of Appliances 55

Personal 56

Obituary 56

Ascot's Campaign for Nursery Schools 56

Discussion on the Institution Symposium—The Gas Industry : 1941 and After 57

Waverley Association of Gas Managers 64

Gas Products Prices 69

Gas Stocks and Shares 69

THIS WEEK'S ADVERTISERS

	PAGE
Alder & Mackay, Ltd.	70
Baldwins, Ltd.	44
Bale & Church, Ltd.	73
Blakeley, Firth, Sons & Co., Ltd.	73
British Aero Components, Ltd. ...	49
British Fittings Co. (Hendon), Ltd.	70
Brotherhood, Peter, Ltd.	53
Clayton, Son & Co., Ltd.	Cover IV
Cowan, W. & B.	Cover III
Crossley Brothers	48
Crossley-Premier Engines, Ltd. ...	71
Davison & Partner, Ltd. ...	51
Dempster, R. & J., Ltd. ...	41
Dempster, Robert, & Sons, Ltd.	62, 73
Derbyshire Silica Firebrick Co., Ltd.	42
Donkin Co., Ltd. (The Bryan)	Cover II
Durasteel Roofs, Ltd.	73
Ellison Insulations, Ltd.	73
"Four Oaks" Spraying Machine Co.	46
Gas Meter Co., Ltd. ...	Cover IV
Gas Purification and Chemical Co., Ltd.	73
Glover, Thos., & Co., Ltd. ...	54
Grant & West, Ltd.	74
Harris & Pearson, Ltd. ...	Cover IV
Harrisons (London), Ltd.	73
Harvey, G. A., & Co. (London), Ltd.	43
Head, Wrightson & Co., Ltd. ...	70
Holmes, W. C., & Co., Ltd. ...	75
Horden Collieries, Ltd.	71
Humphreys & Glasgow, Ltd. ...	52
Hyde, Silas, Ltd.	42
Keith Blackman, Ltd.	76
King, Walter, Ltd.	72
Laidlaw, R., & Son (Edin.), Ltd.	46
Lancashire Dynamo & Crypto, Ltd.	45
Londex, Ltd.	73
Main, R. & A., Ltd.	65
Mewburn, Ellis & Co.	73
Parkinson, W., & Co.	54
Peckett & Sons, Ltd.	72
Peebles & Co., Ltd.	44
Pegson, Ltd.	Cover II
Radiation, Ltd.	66, 67
Reavell & Co., Ltd.	72
Ruscoe, John, & Co., Ltd. ...	72
Simon-Carves, Ltd.	47
Slingsby, Walter, & Co., Ltd. ...	72
South Hetton Coal Co., Ltd. ...	72
South Metropolitan Gas Company	69
Spencer (Melksham), Ltd. ...	48
Sternol, Ltd.	71
Strachan & Henshaw, Ltd. ...	73
Stringer Bros.	42
Trotter, Haines & Corbett, Ltd. ...	73
Visco Engineering Co., Ltd. ...	76
Wakelin, F. H., Ltd.	74
Walker, C. & W., Ltd.	50
Walker, Crosweller & Co., Ltd. ...	43
West's Gas Improvement Co., Ltd.	68
Westwood & Wrights, Ltd. ...	72
Wilson (George) Gas Meters, Ltd.	Cover I
Woodall-Duckham Co., Ltd. ...	61
Wright, Alex., & Co., Ltd. ...	50
Appointments Vacant	74
Contracts Open	74
Patents	73
Plant, &c.	73
Plant, &c., For Sale and Wanted	73
Publications	74

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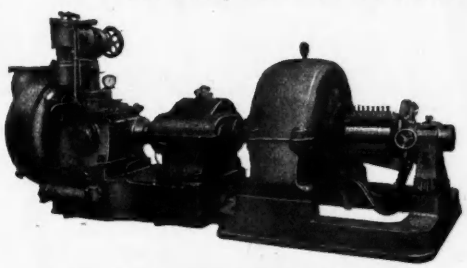

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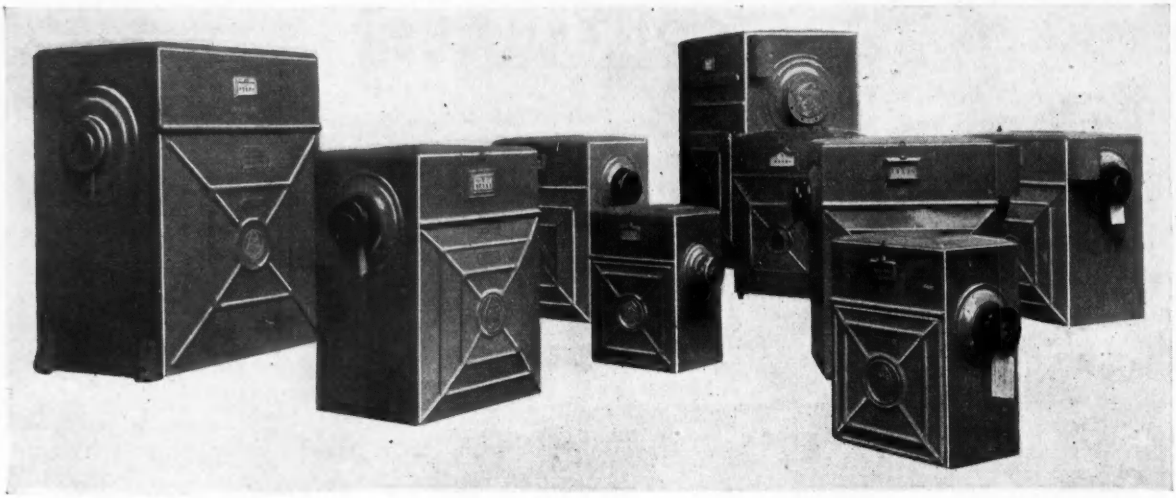

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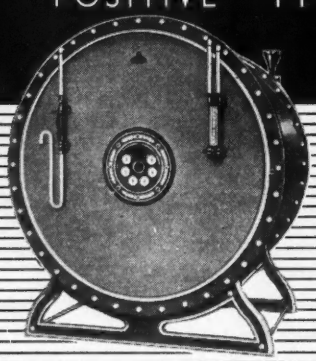

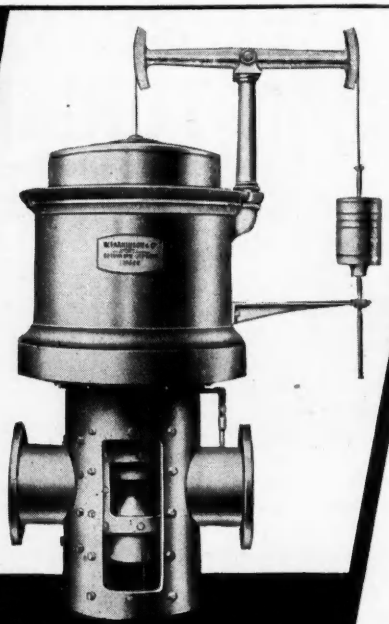

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P.6

GAS JOURNAL, JULY 9, 1941

VOL. 235 93rd YEAR No. 4077

EDITORIAL NOTES

STANDARDIZATION OF COKE

WE have already discussed the Symposium Papers at the Institution Meeting by Sir Frederick West, who dealt with standardization of calorific value; and by Dr. Harold Hartley, whose subject was sulphur reduction as a future requirement in town gas. We turn now to the two other Papers on standardization—those by Mr. W. L. Boon on the standardization of coke grades and properties, and by Mr. R. J. Rogers on the standardization of consumers' appliances. No one has worked harder than has Mr. Boon towards the rational marketing of coke, its proper preparation for the market, the regulation of prices in co-operation with the merchants, and the development of new fields and of new appliances. The headway which has been made since he assumed control of the London and Counties Coke Association has been recorded from time to time in our pages, and the record is undoubtedly an encouraging one. Yet we have a long way to go before it can be said that coke is being marketed throughout the country to the best advantage of supplier and consumer alike.

Mr. Boon's Paper concentrated on the standardization of sizing—as a start, and a very important first step, to the standardization of other characteristics of coke, such as ash and moisture content, ignitability, and so on. The Author contended that the factor which exerts the greatest influence in the successful use of most gas cokes is that of size, and, however the quality of the coke may be affected by other characteristics, the use of the correct size is essential if the consumer is to obtain the best results. For the past ten years and more we have in these columns made a plea for country-wide standardization of coke sizes and nomenclature, and in the South of England at any rate an important degree of size standardization has been established. For five years now six standard sizes, set out by Mr. Boon in his Paper, have been marketed in the area of the London and Counties Coke Association, covering a total production of practically 4,000,000 tons per annum. Experience has indicated that all consumers' requirements of coke, whether for domestic or industrial use, have been adequately met by one or other of these sizes. Prior to the introduction of the standards, there were at least forty different sizes of coke produced and sold in gas coke markets in the South. The standards have cut-out in the area concerned such out-of-date definitions as apples, chestnuts, potatoes, beans, peas, among other fruity or vegetarian terms—terms which doubtless led to the low-down music hall expression "Go and eat coke." Yet we know that these old-fashioned definitions, wholly incompatible with modern marketing or the needs of a progressive industry, are still used in some parts of the country, causing confusion. Again, a very large tonnage of furnace coke is still sold in the South of England in a wide variety of sizes because coke oven owners have not adopted the standards laid down for gas coke. This bewildering variety was set out by Mr. Boon and correlated to five equivalent L.C.C.A. sizes. The while (we quote from the Paper), "there are no peculiarities from the point of view of gas coke utilization in any part of the country which, in my view, would require any departure from these standards," and we thoroughly agree that "there seems nothing to prevent consideration of this particular aspect of coke standardization being undertaken during the war period."

There is another aspect of coke grading brought out forcibly by Mr. Morland Fox during the discussion—the viewpoint of the manufacturer of screening plant. In the experience of his firm as screen manufacturers they are called upon by the Gas Industry to supply almost as many sizes of screen mesh as were attributed by Mr. Boon to the coke oven industry. It is obvious that simplification, standardization, and collaboration with plant manufacturers are sorely needed. So much can be done by such collaboration. In an Address given recently to the London & Southern District Junior Gas Association, Mr. Percy Good, Joint Director of the British Standards Institution, mentioned as example that 2,000 patterns of tub wheels had, by agreement, been reduced to 17. As another example of multiplicity, Mr. Boon observed that of the 300 odd sizes of coal produced by the coal industry only about 25 are really necessary. Regard the converse, simplicity. A speaker at the Institution meeting quoted German practice. In Germany about 50 million tons of coke were produced in normal times. About half this quantity was sold publicly for various purposes, and it was sold in four sizes only. Other sizes simply could not be obtained. "Even the most patriotic of us," he added, "will admit that we can learn something from the enemy."

We fully appreciate that standardization of coke sizes is one step only towards standardization of quality, but the Gas Industry would be well advised to adopt the size standards recommended by Mr. Boon; and there is no reason why, even in wartime, other coke properties should not be standardized to a considerable extent. As was emphasized at the meeting, while ash content and volume are perhaps beyond the control of the Gas Industry during wartime, moisture can easily be controlled and combustibility is capable of a definite degree of control by making use of the C.A.B. or the volatile therm test. And as for appliances, there is no doubt that very efficient domestic appliances can be made for burning coke, and if suitable fuel is marketed the popularity of these appliances will increase rapidly after the war.

AND OF APPLIANCES

IN the field of domestic gas appliances Mr. R. J. Rogers has for long been a staunch advocate of a measure of standardization to simplify manufacture and hence effect economy. One may recall his Paper at the conference of the British Commercial Gas Association held four months prior to the outbreak of war in which he set out his views clearly; and, in fact, his Institution Symposium Paper can be regarded as a summation of these views, with a strong exhortation to all concerned with the post-war progress of the Gas Industry to collaborate in the fullest measure in rational standardization and to be prepared to sink their individual prejudices. On many occasions he has expressed the opinion—and we ourselves have time and again voiced the same opinion in these columns—that the form of standardization which will prove of most value in promoting the domestic load is not that which involves the laying down of rigid specifications of performance, materials, and design, but rather the avoidance in a given design of individual requests for slight modifications. Such alterations are costly and defeat the effort to keep down costs by bulk production. The point was vigorously stressed by Mr. Cyril Davis at the Institution meeting during the discussion. As example he referred to the oven door. One undertaking, he said, will say it does not want any names on its doors except its own particular pet name; another will say it will have the name of the cooker but not the maker's name; another will say it wants the name on the right or the left, and so on. These whims mean that the manufacturers have to carry thousands of parts and entail increased cost and delay in execution of orders. And the remedy is so very simple. It passes our comprehension why, year after year, exhortations should have to be made to gas

undertakings to cease childish and costly practices and realize the benefits to be derived from common-sense standardization, which can undoubtedly be a tool of very great value. Moreover, that the public will have little money to spend after the war needs no elaboration.

After the war the Gas Industry will desire appliances as low as possible in first cost consistent with sustained efficiency and satisfactory performance in use. It seems to us that extended hire-purchase terms will once again be the order of the day, and that the durability factor will have to be considered. To our mind it would be folly to delay planning for the future, and among the items of such planning should be standardization of prices charged for the same appliance by different undertakings —indeed, neighbouring undertakings. Divergencies engender doubt and annoyance in the minds of consumers, and any scheme of rational standardization should include at least regional prices for gas undertakings. This again has been a strong point with Mr. Rogers for a long time; it was referred to by Mr. Davis in the discussion; and not for the first time do we mention it here. It would so obviously be an advantage if gas consumers were asked the same price for the same type of article. If, as we think, it may prove difficult to work out quickly a standard to be adopted throughout the country, we should certainly start in regions. Consumers are befogged, and rightly demand an explanation when, as exists to-day, some undertakings in a given area charge £2 or £3 more than other undertakings in that area for exactly the same article. The great variation in policy and prices between adjacent undertakings should be eliminated. There ought not to be a wide difference between some undertakings' ideas of a reasonable profit on "fittings account" and the view of those whose policy it is to sell appliances at or below cost to secure the load. We have spoken of divergences of the order of £2 or £3, yet we recollect an analysis made shortly before the war showing that while one undertaking charged for providing and fixing a certain multi-point water heater £26, another charged £18, while another—and not far distant—had a selling price of £13 10s.

We know that just prior to the war steps were being taken towards regional standardization of appliance prices. For example, all companies in the western group of the South-Eastern Gas Corporation adjoining the Gas Light and Coke Company were in May of 1939 selling appliances at the same price as the Company, while a greater degree of uniformity in the pricing of appliances had been achieved for the companies in Kent and East Sussex. This type of organization should be worked for and planned for now throughout the country. Schemes should be formulated ready to be put into action on the return of peace. The standardization of which Mr. Rogers wrote should have been tackled with more enthusiasm and unanimity before the war. It stands out a mile that it should be tackled co-operatively now if the progress of the post-war Gas Industry is to be safeguarded.

Personal

Mr. JOHN T. HAYNES, Deputy Engineer and General Manager of the Bournemouth Gas and Water Company, has been appointed Engineer and General Manager as from July 1, 1941, in succession to Mr. P. G. G. Moon, who has held that position for the past twenty-one years and has now retired on pension.

Mr. Moon retains his seat on the Board of Directors, to which he was elected in January of this year.

* * *

At the last meeting of the Board of Directors of the Ipswich Gas Light Company the Chairman, Mr. Henry Woodall, presented Mr. G. A. MALLETT, who recently retired from the position of General Manager and Secretary, with a mahogany secretaire and bookcase, and expressed their grateful appreciation of his long and faithful service to the Company. Mr. Mallett, who suitably acknowledged, had previously received at the hands of Mr. A. W. Mather, Secretary, on behalf of the staff and employees, a Rolex Oyster watch, and from Miss W. A. Pemberton, on behalf of the lady members of the staff, a morocco stationery case and silver inkstand.

* * *

The wedding took place at Solihull Parish Church, Warwickshire, on June 28 of Mr. WILLIAM ROBERT DRUMMOND, B.Sc., C.A., Secretary of the National Gas Organizations, Scotland, and son of the late Mr. William Drummond and Mrs. Drummond, of Bearsden, Dumbartonshire, to Miss Bettie Lorraine Cleaver, daughter of Mr. and Mrs. Richard Cleaver, of Solihull.

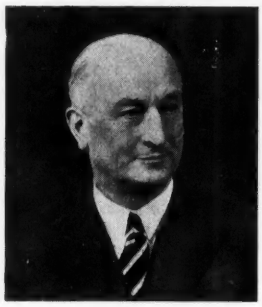
* * *

Mr. A. E. SIMPSON has resigned his position at Macclesfield on his appointment as Deputy Gas Engineer at Spenborough. Mr. J. G. TILLEY, Deputy Engineer to the Halesowen Gas Company, is to succeed Mr. Simpson at Macclesfield.

* * *

Radiation Appointments

Mr. J. F. DAVIES, the Deputy Chairman, has been unanimously appointed Chairman of Radiation, Ltd., in succession to the late Sir C. Herbert Smith.



Mr. Davies began his career in the Gas Industry when, as a young man, he joined the staff of John Wright & Co., Ltd., of Aston, Birmingham. After holding various positions with that firm, including that of London Manager, he was in 1912 appointed General Manager of the Company, and in 1914 was elected a Director, subsequently becoming Chairman of the Board. On the formation of Radiation, Ltd., in 1919, Mr. Davies was appointed a Managing Director of that Company, and in 1937 was elected Deputy Chairman.

Mr. Davies is a member of the Grand Council of the Federation of British Industries, of the Council of the Birmingham Chamber of Commerce, and of the Management Board of the Engineering and Allied Employers' Association.

* * *

Mr. CYRIL G. DAVIS has been appointed Deputy Chairman of Radiation, Ltd. He entered the Gas Industry as a young man in the Davis Gas Stove Co., Ltd., of Luton. He joined the Board of that Company in 1906, and later succeeded his brother, the late Harold Newsom Davis, as Chairman.

Mr. Cyril Davis has been a Managing Director of Radiation, Ltd., since its formation in 1919.

Obituary

The death occurred on June 30 of Mr. GODFREY M. GRIBBLE, aged 61, who had been Manager of the Kirby-in-Ashfield U.D.C. Gas Department for 31 years. He received his training at the Eastcroft Gas-Works of the Nottingham Corporation. Mr. Gribble had devoted much of his time to the Special Constabulary, of which he was Deputy Chief.

* * *

Mr. C. F. KNIGHT, General Manager of the Sutherland Meter Co., of Birmingham, died on June 7 at the age of 50. He had been 18 years with the Company. After serving his apprenticeship with William Parkinson & Co., of Belfast, Mr. Knight joined the firm of Parkinsons at Manchester, with whom he served until he joined the Royal Ulster Rifles on the outbreak of war in 1914. After the war he returned to his firm at Manchester where he stayed until 1923.

Ascot's Campaign for Nursery Schools

The Exhibition, sponsored by Ascot Gas Water Heaters, recently held at Charing Cross, and described previously in these pages, was transferred to the Scottish Building Centre, Glasgow, where it was officially opened by the Lord Provost, Sir Patrick Dollan, on June 25. The Lord Provost said that if reception areas want to make an experiment with Nursery Schools, help would be forthcoming. More women and children should leave Glasgow before the winter. There must be an abandonment of false complacency due to the lull in enemy air raids.

The Ministry of Food co-operated by running daily demonstrations in connexion with feeding the " Under Fives," using gas equipment. A model of the first school erected under the scheme showing an "Ascot" gas water heater installed was also on view. Councillor E. Rosslyn Mitchell, Convener of the Education Committee of the Glasgow Corporation, presided, and other speakers included Lady Pentland, who said that Nursery Schools had had a miraculous effect on mothers and children. As a result of the focusing of Ministerial interest on the first Exhibition at Charing Cross, the Ministry of Health is now financing the erection of ten of these Centres in England, and the main object of the present Exhibition in Glasgow is similarly to enlist the support of the Scottish Department of Health. The presence of the gas appliances at the Exhibition reminded the large and distinguished gathering present of the service gas can render in the care of the younger generation.

A Meeting of the Executive Committee of the Gas Companies' Protection Association will be held at 5, Victoria Street, London, S.W. 1, on Friday, July 11, at 3.30 p.m.

The Lincoln City Council has received as "private and confidential" the annual trading report of the Corporation Gas Undertaking. Councillor Bower, Chairman of the Gas Committee, congratulated the Gas Engineer and his Department upon a record year.

DISCUSSION ON THE INSTITUTION SYMPOSIUM—THE GAS INDUSTRY: 1941 AND AFTER

We continue our report of the discussion on the nine short Papers submitted at the 78th Annual Meeting of The Institution of Gas Engineers held on June 11. The Papers were published in full in our issue of June 18, which contained an account of the proceedings at the Meeting.

The following are written contributions.

(*Continued from p. 24*)

Paper by Sir Frederick West

Mr. **T. C. Finlayson** (London) wrote: Sir Frederick West reminds us in his Paper that the subject of the standardization of declared calorific values has been actively canvassed for nearly twenty years. The arguments in favour of some degree of standardization are well known and generally accepted. And yet we find ourselves to-day part of an industry supplying gas of 26 different calorific values. I would like strongly to support the Author's suggestion that The Institution of Gas Engineers and the National Gas Council should forthwith consider this question of standardization of calorific value before the Gas Industry becomes involved in post-war reconstruction problems. If the Industry could face the future with, say, four calorific values, a substantial step would have been taken in meeting future difficulties. Simplification in appliance design and greater opportunity of inter-linkage of adjacent districts would be two immediate consequences.

It is generally agreed that the ideal of a single declared calorific value is unattainable, but I venture to suggest that if four calorific values were adopted as standards, namely, 500, 475, 450, and 425 B.Th.U. per cu.ft., then within ten years from their adoption the major proportion of the gas in Great Britain would be supplied at either 475 or 450 B.Th.U. per cu.ft., thus narrowing the range still further and approaching more closely to the ideal of a single calorific value. There are to-day a number of tendencies which are all leading in the direction of a reduction in the declared calorific value of gas.

(i) Many undertakings have invested money in benzole plants. The desire for a sulphur-free gas leads in the direction of complete rather than partial stripping of the benzole from the gas. The hydrocarbon oil tax extends until at least 1950, thus showing the Government's intention to support the production of home produced oils. Benzole washing seems therefore to have a post-war future. In many cases it is advantageous to reduce the calorific value of the gas consequent upon benzole washing rather than to alter the retort house conditions to enable benzole washing to be carried out.

(ii) The essential feature of gas manufacture by coal carbonization is the production of enrichers—that is to say, those gaseous constituents which have a calorific value above 300 B.Th.U. Enrichers which are not made from coal have to be made, at the moment, from imported oil, and from a national standpoint it is therefore an advantage to standardize at the lowest calorific value consistent with economic production and distribution costs. In other words, if 450 B.Th.U. gas is as satisfactory as 500 B.Th.U. gas, then 450 B.Th.U. gas requires less enrichers per therm of gas sold. A corollary to this point is that if the Gas Research Board high-pressure methanization work should happily attain commercial success, less methane has to be produced per therm of gas sold if the final aim is to make 450 B.Th.U. rather than 500 B.Th.U.

(iii) Gas supplied at 450 B.Th.U. gives a more easily attainable ratio of gas/coke sales. It is not always appreciated that the supply of gas at 450 B.Th.U. means 25 per cent. less coke for sale per therm of gas than does the supply of gas at 500 B.Th.U., a factor of some importance when planning a large development in gas sales based on a tariff structure.

(iv) There is growing evidence that improved coke for the domestic fire, portable producers, and other users, can be made in continuous vertical retorts by the carbonization of feebly-coking coals, followed in certain cases by external activation of the coke. This may or may not prove a factor of importance depending upon future legislation on such matters as importation of liquid motor fuels, smokeless fuels in cities, and so on. But apart from this, the supply of good coking coals in this country is not unlimited. Any tendency to reserve such coals for utilization in the coking industry, whilst calling upon the Gas Industry to utilize a greater proportion of feebly-coking coals, would lead to a reduction in the calorific value of the gas.

Whether or not the tendencies develop in the direction that I have suggested, the first step is surely for the Gas Industry to take action in reducing the number of declared calorific values from 26 to 4, as suggested by the Author.

Mr. C. H. Chester (Swindon) wrote: The standardization of declared calorific values will be early in the post-war picture and 3 or 4 standards should be sufficient. This would allow of standard meters, reading direct in therms, which would give confidence to consumers. Appliances, too, good though the standard is, will not be so sensitive to small variations in specific gravity and calorific value. Appliances to-day are built to accommodate, by nipple and air adjustment, too wide a variation in quality.

Further, this standardization tends towards cheaper production and may also influence gas undertakings, plant builders, and operators to work in better co-ordination and with greater confidence.

The importance of type of coal available is likely to be over-emphasized and ease of working allowed to interfere with the production of the most economic therm in relation to particular sales of gas, peak loads, and future development.

Benzole extraction is part of a national fuel policy, and should be compulsory. It is always profitable if relation be only had to the cheap therm which gas engineers try to sell, and its effect on overheads. It should be regarded as only an additional consumer, in the same way as new business is looked for.

Dr. G. E. Foxwell (London) wrote: No one will question the need for standardization of the declared calorific value if it can be shown to assist in the sale of gas. The basic question to be answered is whether such standardization will reduce the overall cost of gas per therm at the consumer's burner. The Author has not answered this question and I should like to hear his views upon it. It may be that this standardization will reduce the cost of appliances, but it may also be that by imposing a standard different from that which an undertaking has found it best to provide now, additional costs will be incurred which will result in the cost of gas being increased. It is necessary to proceed rather carefully.

The Author argues that standardization of calorific value would reduce the psychological resistance of the consumer to a therm charge when the meter reads in volume. I suggest that unless one single standard calorific value is adopted for the whole country this psychological difficulty must remain. So also will the difficulty of linking up many neighbouring undertakings. Many of the arguments that Sir Frederick West uses are really arguments in favour of one single calorific value; but with the existing variation in the types of carbonizing plants and coals this is manifestly impossible.

I would further ask upon what basis the suggested calorific values are based. They appear, as given in the Paper, to be arbitrary figures selected entirely as representing the most popular present practice and possibly reduced by 25 B.Th.U. to allow for benzole recovery. Since our object must be to provide the cheapest gas at the consumer's burner, ought we not first to make a careful calculation to determine at what calorific value the cheapest gas can be produced with each of the general types of coal available for gas making in different parts of the country? Nuneaton Gas Company uses a simplified type of gas-making plant which is claimed to make gas very cheaply indeed. So long as the mains can be proportioned to take the correct economic load of gas, there is practically no difference in the overall cost per therm of distributing low-grade gas and high-grade gas, as a simple calculation will show, so that the overall cost per therm at the consumer's burner may be less with 200 B.Th.U. gas than with 500 B.Th.U. gas. I am not, in this argument, attempting to suggest that low-grade gas would be the quality best suited to the Gas Industry as a whole; my only purpose is to suggest that careful calculations shall be made to determine what is the best calorific value to be used in order to get gas to the consumer's burner head at the cheapest price per therm, having regard to the available plant, coals, mains, and local circumstances.

Gas distribution experts have insisted in the past and during this discussion upon the need for standardization not only of calorific value, but also of the combustion characteristics of gas as disclosed by the A.T.B. Number. Scientifically they are right, but are they right technically? The Gas Industry must fit into a national fuel policy. In that policy nothing must be wasted and the Government may well insist that the Gas Industry shall make use of coke oven gas, as I have suggested in my Paper in this Symposium, of sewage gas, of methane derived from mines, of such natural gas as is discovered by boring for oil, of petroleum refinery gas (for I believe the practice will grow of bringing in crude petroleum and refining in this country) and so forth. The Gas Industry will not then have the composition of its gas under its control and although the calorific value may be adjusted, constancy of A.T.B. Numbers will be an impossibility. Therefore I ask whether burner design is in fact to-day on sound practical—as distinct from theoretical—lines?

Mr. W. T. Dunn (Seaton) wrote: At the time of the passing of the epoch-making Gas Regulation Act of 1920, with which our Institution was so conspicuously identified, I pointed out the advantages which would accrue from the adoption of one standard calorific value throughout the country. I had in mind the obvious effects on the production of gas-consuming appliances, since the behaviour of all such appliances would be similar everywhere with standard gas. The result, of course, would tend to a cheapening of production costs. It may be argued, as pointed out by Sir Frederick West, that the difference in quality of coals necessitates a variation in calorific value declared by the particular gas undertaking. Nevertheless, it would appear that, as simple processes are available for reducing or augmenting the calorific value of the gas to bring it to that required, this objection to universal standardization is removed.

The method of measuring the value of gas supplied might be sim-

plified if meters were to record therms on their dials instead of cubic feet as at present. The late Dr. Carpenter introduced, I believe, such a method of measurement. The adoption of standard gas obviously would greatly assist in such an alteration of the present system of measurement.

Another consideration of great importance is that when gas appliances of all descriptions can be standardized in manufacture, consequent upon the adoption of standard calorific gas, the popularity of gas will be greatly enhanced. The price of appliances in every district of the country could be made uniform. Intending customers in adjoining districts compare notes on the prices, and receive the impression that if an appliance in one district costs more than in another, some explanation must be sought for. This tends to cause distrust in the minds of the might-be purchaser.

With an increase in the number of gas consumers it naturally follows that less vitiation of the air we breathe will result. The improper combustion of coal in open grates and boiler furnaces, &c., is to be deprecated. It would appear that, as so many Acts of Parliament are being placed unopposed on the Statute Book, a measure providing for the proper utilization of our national mineral should be introduced forthwith and possibly dealt with in the same way. Surely the subject is at the present moment of the most vital importance, since we are warned of the prospect of a shortage of coal during the coming winter.

In conclusion, as the matter is obviously of such great moment, the Gas Research Board might, if it has not already done so, consider the desirability of moving in the direction of a revision, by the Board of Trade, of the Gas Regulation Act, 1920.

Paper by H. Hartley

Mr. **C. H. Chester** (Swindon) wrote: I remember Dr. Hartley once saying with emphasis in this room—"sulphur must go." I was impressed and like many others, while in agreement, was more concerned in producing and selling more and cheaper therms. However, by the Holmes G.L.C. process, I am converted, and after working for four years with gas which has contained from 7 to 10 gr. the proof is there. The exigencies of war have, however, necessitated periods of old-type working with gas of 20 to 30 gr. and the number of complaints arising in these odd days of "smelly cookers and dirty gas" has convinced me. The reduction in water-heater maintenance is most marked, however, and, if only for the effect on consumers of "clean" gas, is well worth while. When taken in conjunction with complete benzole recovery and steady gas quality, it is just another part of the "service which sells."

Dr. **G. E. Foxwell** (London) wrote: The desirability of the reduction of the sulphur content in town gas almost to zero has been put forward repeatedly by gas appliance manufacturers and by some gas engineers. There are industrial processes for which this low-sulphur gas is necessary. The principal argument put forward by Dr. Hartley is that the cost of maintenance per appliance would be reduced by the removal of sulphur and he gives a set of figures for normal-sulphur gas. We do not know to what extent the maintenance cost is due to sulphur. Can Dr. Hartley give comparable figures for maintenance from one of the "few outstanding exceptions" which he mentions in the first paragraph of his Paper as having tackled the complete removal of organic sulphur? If the maintenance cost figures could then be shown to be very substantially reduced under parallel circumstances his case would be immensely strengthened.

Paper by W. L. Boon

Mr. **J. H. Dyde** (North Middlesex) wrote: Our aim as producers and sellers of coke should be towards the successful and facile utilization of our product. To achieve this aim, standardization should be directed along two courses:

(i) In preparing the product itself for use in the thousands of existing appliances.

(ii) In designing the new appliances being produced for coke utilization.

In both these directions the London and Counties Coke Association has, in the relatively short period of its existence and in the area it serves, completely transformed the whole aspect of utilization and has consolidated commercially a market, the potentialities of which have hitherto never been realized by the Gas Industry.

So far as quality is concerned, no one will deny the value of a minimum moisture and ash content. These are two qualities a consumer can see and appreciate, and, apart from any deleterious effect that high ash and moisture content may have on ignition or combustion, both give the impression that value for money is not being obtained. A minimum ash content will not necessarily eliminate complaints, for if the ash is present largely in the form of lamellar shale pieces these accumulate in the grate bars of continuous use appliances, necessitating periodical shut-down and again giving the consumer the impression that the fuel is of poor quality. Shale, too, is most undesirable in coke for the open grate, because of its tendency to splinter and fly into the room. On the other hand, ash disseminated through the coke substance is easily removed by shaking and other mechanical disturbance, and does not cause complaints unless present in quantity. In any standardization of quality, therefore, I suggest that some method should be employed to assess the percentage of extraneous ash as distinct from inherent ash.

One other readily controllable physical quality is that of size, and because of its proved importance in practice the Author has devoted the major portion of his Paper to it. Undertakings which have their own representatives dealing pesonally with coke complaints will verify the importance of using the correct size of coke in a given appliance. The sizes sold by the London and Counties Coke Association apply well enough, according to the experience of my undertaking, but we have found a definite demand for a sub-division of the No. 3 boiler coke. This came about quite accidentally, since we obtained a partial segregation within a large hopper serving this grade, in which the first chute gave smaller coke than the second. As a result, many of our consumers' record cards are now marked "small No. 3" or "large No. 3." The "small" is particularly suitable for the many boilers of low fuel capacity fitted in the housing estates in my undertaking's area. While the value of reducing the number of grades to the minimum is fully realized, nevertheless I submit that a division within the No. 3 grade be included for future consideration, perhaps within the size limits of say ½ in. to 1 in. and 1 in. to 1½ in.

Other lesser-known physical and chemical properties, such as bulk density, reactivity to oxygen and carbon dioxide, are greatly influenced by the type and method of carbonization and as most undertakings, for economic reasons, can only have one type of plant to produce one quality of coke, then obviously a compromise has to be made to secure property advantages most suited to the market requirements in the area; this makes standardization in such properties difficult and perhaps undesirable from a commercial point of view.

Dr. **G. E. Foxwell** (London) wrote: Mr. Boon is undoubtedly wise in going one step at a time in standardizing the quality of coke. The "burnability" of coke in a given appliance is a function of its combustibility and of its size, as the work of the Fuel Research Station has shown. Whilst these size gradings are satisfactory for gas coke it has yet to be proved that they are equally satisfactory for the less combustible oven coke. There are many cokes produced in this country which are not really suitable for domestic use at all, and although we shall make an advance by standardizing coke sizes, in my view we shall not place coke quality on a satisfactory basis until we also standardize combustibility, in the sense of ability to burn under practical conditions. The combustibility test, as I have urged repeatedly in other places, is the only really practical test for coke, because the essential quality of coke is that it must burn satisfactorily in a given appliance.

It appears therefore that we should standardize a few sizes of every type of appliance and for these appliances and for each size we should lay down certain standards of combustibility as ascertained by a practical test which is yet to be devised. I do not suggest that this is work which can be done now, but it must surely be one of the first of our post-war tasks to put the quality and characteristics of coke on to a really practical standard basis. Today one buys coke from large undertakings having different types of carbonizing plant, and even though the same size of coke is delivered each time, each delivery may differ from its predecessor in its behaviour in the same appliance because of the nature of the coal from which the coke is produced, of its ash content, or of the type of carbonizing plant in which it is made. This difference, largely a difference of "burnability," is very disturbing to the consumer and it is a difficulty which size grading alone does not overcome.

Dr. **W. Davidson** (Radiation Ltd., Birmingham) wrote: In discussing the standardization of coke grades Mr. Boon has chosen one of the most important points in the preparation of coke for the market. His Paper is especially valuable at this time, since our fuel supplies must be used to the best advantage, and the maximum efficiency can be obtained only when the fuel is correctly graded.

We have examined many cokes in our Solid Fuel Laboratories, and we have been surprised at the large number which were incorrectly graded, even when the supplier was informed of the appliance for which it was required. Attention to this point often led to good results being obtained from a coke which had previously been considered unsuitable for a given appliance.

The importance of correct grading of coke for the domestic coke fire was clearly demonstrated by the tests described in Section IV of Institution Communication No. 200.* It was shown that, using a comparatively reactive vertical retort coke (C.A.B. 0.052) the ease of kindling and rate of recovery of the fire after re-fuelling were appreciably reduced by the presence of coke less than ¾ in. or more than 2 in. in the sample. It was also found that the most unreactive cokes require to be most closely graded. Unreactive chamber and horizontal retort cokes should be graded between 1 in. to 1½ in. when used for the open grate. Vertical retort cokes may be graded between 1 in. and 2 in., while the still more reactive low-temperature or activated cokes may be graded between ¾ in. and 3 in.

For the satisfactory operation of cooking appliances it is again important that the grading of the fuel should be correct. It is usual to heat the hotplate chiefly by radiation from the firebox and the ovens by the circulation of hot combustion gases around them. In many appliances designed to burn 1 in. to 2 in. coke (Size No. 2 of L.C.C.A.), if ½ in. to 1½ in. coke (Size No. 3) be used, the radiation to the hotplate will be reduced and the heat transfer to the ovens will be correspondingly greater. To obtain a satisfactory hotplate performance the user will in those circumstances often overheat the ovens and burn the food.

There is no doubt whatever that exceptionally efficient domestic appliances can be made for burning coke, and if suitable fuel is marketed the popularity of these appliances will increase rapidly after the war. There is every prospect that attention will be given to the

* *Trans. Inst. Gas Eng.*, 1931–39, **88**, 441.

quality of the fuel. The general adoption of the L.C.C.A. standard sizes seems to be only a matter of time, while activation will no doubt be practised for those cokes whose reactivities exclude them from the domestic market.

Paper by H. R. Hems

Mr. **D. Chandler** (South Metropolitan Gas Company) wrote: There has probably been no department of our business in which conditions have become more unreal by peacetime standards than the industrial section. In peacetime the industrial market was highly competitive with gas a rather depressed spectator at times. In the rush of gradually growing re-armament work two factors have probably given gas chances which it would not have had under stable conditions: firstly, that heat-treatment fuel costs are very frequently of almost negligible importance in relation to the costs of material, labour and overheads, although now with greater turnover the last item has come down considerably; secondly, with output a matter of urgency, money flows more freely into capital works, such as furnace additions or replacements, and at the same time tends to erode the solid, economical, almost cheese-paring attitude. In other words, the prices of gas and of equipment have lost their importance and what we used to consider the ancillary advantages of gas, the monetary value of which was often not assessable, have now become the deciding factors in the desire for gas equipment. I say "desire" because the demand for new equipment exceeds the supply and second-hand gear and conversions have to take its place. The demand for gas itself in what might be termed "industrial reception areas" at times exceeds the supply, even when the local gas undertaking has extended its plant.

The industrial dispersal scheme has brought about unprecedented conditions for the Gas Industry and the period following the war will tax our ingenuity to the utmost. While industrial managements may find it necessary and desirable to remain "dispersed," will nostalgia take their workpeople back to the bigger towns and thereby necessitate the return of the industrial concerns to the towns? Will a few years of willingly-accepted industrial regimentation counter-balance the traditions and habits of these conservative folk? I doubt it. I have stressed this point, as I think we must realize that there are factors, other than the purely technical, that will complicate our "peaceful" future. It seems to me that in a matter like this one can plan and plan, but come up against a staff which is unhappy in unfamiliar and perhaps uncongenial surroundings which make it difficult, if not impossible, to settle down, and one's plans come to nothing. I know of one town, with a long manufacturing history, which even before the war was quadrupling the size of its gas-works to accommodate a branch factory of a large firm. They will probably be fortunate in that the branch factory will have a big peacetime future, but I can imagine that many other gas undertakings in the same position will be less fortunate. Remember, too, that our plans depend upon the plans of industry under governmental control. It seems to me that we have in outer districts to visualize continued industrial expansion or a return to something like pre-war business, and in the big industrial towns stabilization of existing business or a certain and unpredictable return towards pre-war conditions. We have to plan for all conditions and shall need to retain a lively, flexible mind on this matter.

No one can dispute that uniformity of prices for industrial gas would help considerably and there is no one who knows this better than many of the small inland gas undertakings in the south, or, for that matter, even the larger southern undertakings. Are the more favourably placed undertakings to keep their prices up and take themselves away from the competitive range or are the less favourably placed undertakings to cut their prices to uneconomic levels in an effort to get unremunerative business? Physical and financial conditions just do not make uniformity workable. There is a lot of hard thinking to be done on this point as well as on practically every aspect of the industrial gas business, which probably offers more opportunity for mental effort than any other part of our business—possibly than all the rest put together.

I do not think I have materially assisted in the solution of the problem, but in the light of experience I have wished to stress its complexity.

Mr. **C. H. Chester** (Swindon) wrote: The question of industrial output is raising great problems, but Mr. Hems is right. I know of one firm which simply would not consider gas because of the price and service offered elsewhere. The effect on overheads is noticeable by the incidence of other peaks. Having trebled the output in 7 years, I can say overheads on all business have dropped by 2.1d. per therm. The overheads bear no relation whatever between large industrial and small domestic consumers, but why not make more domestic consumers into small "industrial consumers"?

Paper by W. M. Carr

Mr. **R. Walker** (Manchester) wrote: The Gas Industry needs rationalization, for it is in many respects analogous to the position of the railways when they consisted of 167 separate concerns instead of the 4 companies operating to-day. There are undoubted advantages to be gained by regional grouping and once this becomes the defined policy of the Gas Industry there will be little difficulty in bringing it into operation. Too much emphasis has been placed on the assistance given by the Government to the electrical industry, but it must not be overlooked that no direct financial assistance was given for the grid. The stocks issued by the Central Electricity Board were not given trustee status and in some ways the "help" given by the authorities was more of a liability than an asset. In June, 1932, the electrical industry was advised to issue a substantial block of high-yielding securities and a few days later the Government announced the conversion of War Loan, which brought interest rates down very considerably. It should be quite possible for the Gas Industry to offer at least as sound a security as the electrical industry, if it is deemed expedient to construct a gas grid or organize regional grouping.

The Holding Company movement has not resulted in the same advantages to the Gas Industry as have accrued to the electrical industry by the adoption of the grid. There are still in the Gas Industry too many units, small and sharply localized, which are uneconomic and survive only at the expense of the consumer, thereby preventing general expansion.

So far as the larger undertakings are concerned, the financial structure is sufficiently sound to meet post-war requirements, but it is certain that many of the smaller undertakings are not in that position. Further, pre-war local areas will not be found adequate to meet post-war conditions. Consequently, the building up of larger units and the removal of certain statutory restrictions would have a beneficial effect on the Industry's financial structure.

There is no doubt that the problem of post-war reconstruction should be dealt with immediately by the appointment of a strong Committee, divided, say, into three sub-committees, representing commercial, technical, and financial sections. This committee must grapple longer and more definitely with the problems confronting the Industry. It must not degenerate into pious meetings held in London once a month, but, if necessary, it should consist of members who can devote all their time and energies to this important problem for weeks, even months. The assistance of experts on economics or finance, not necessarily connected with the Gas Industry could be placed at the service of the Committee. The technical section should draft programmes dealing with fundamental and applied research, making definite recommendations to the Industry. Greater co-operation with the American Gas and Chemical Industries, in all aspects, would be fruitful, for it would appear that a more advanced position has been reached in regard to synthetic processes in America than in this country.

Mr. **C. H. Chester** (Swindon) wrote: There can be no doubt about the advisability of grouping small undertakings. Many have, and more will, fall by the way, in spite of all the hard work of that stout race of small gas managers. I have seen several 4 to 10 million works treble output in five years, due to linking up with a modern works. This is due to steady and constant gas pressure and quality, technical and sales services, hire purchase and a drop in price of between 30 and 50 per cent. and in increase in profits of the same order or more. Holding Companies should, however, be controlled either by statute or by region and should be limited to physical areas and not by the size of the Capital Account, and the diversity of areas and policy. In such a way the status of personnel will undoubtedly improve.

Mr. **A. McDonald** (Castleford) wrote: I have been particularly interested in the subject of this Paper for a number of years, having been associated with the amalgamation and centralization of the Motherwell and Wishaw Undertakings as long ago as 1926, and in 1928 I advocated closer co-operation in a Paper entitled "The Unification of Gas Undertakings," read before the Scottish Junior Gas Association.

At that time I suggested that there were two acid tests from the view-point of the owner and of the consumer, respectively, to which any such proposal must be submitted:

(i) Will the gains justify the capital expenditure?
(ii) Will the scheme yield better service at a cheaper price?

These, I submit, are still the outstanding criteria to-day.

In the scheme at Motherwell and Wishaw, it was estimated that the financial benefits would be a reduction of 3½d. per 1,000 cu.ft. to some 15,000 consumers, after meeting all the necessary capital expenditure. This estimate was more than fulfilled. In addition it was possible to offer gas at particularly favourable rates for industrial purposes and this brought about extensive developments in the amalgamated undertaking.

In 1935 I was connected with the proposed area gas grid for the West of Scotland and was able to show that we had actually reduced the price of gas by 10d. per 1,000 cu.ft. and created a very useful reserve fund within a period of five years, all in spite of increasing costs of coal, &c. I would like to emphasize that this development of the industrial load even at very favourable rates always means that there is a margin which can be passed on for the benefit of the consumer.

In 1938 I came into control of the Castleford Group of 8 undertakings, the object being to combine these into one unit. Here, again, my experience has demonstrated to me the valuable results to be obtained by both owners and consumers from judicious grouping. There are always a number of local prejudices which must be overcome, but careful handling can usually place these in their proper perspective. It is then possible to bring about very close working, which prevents the large amount of duplication of work unavoidable in separate units. This is a factor which steadily increases and reaches a maximum when full unification is achieved. The degree of service which such a group can give to the consumer is far in advance of that which any of the individual gas undertakings could hope to achieve. This has been forcibly brought to my notice in this group, where it is possible for even the smallest to have services equivalent to those in the larger undertakings.

Colonel Carr has referred to the use of coke oven gas and the development of a grid system of mains. This, to my mind, is an

entirely different proposition from the grouping or centralization of undertakings. The results to be obtained from each are entirely different and where the two schemes are carried out side by side, it is very easy to confuse the issue and credit the one with the results which are really due to the other.

In connexion with the proposed West of Scotland grid in 1935, I was able to show that certain conditions had to be fulfilled before such a scheme would be of any benefit to Motherwell, the principal condition being the price to be paid for gas. There is little doubt that for many of the smaller undertakings this condition is easily met and substantial benefits accrue. For the more efficient undertakings the position is not quite so good, but I submit that a problem of this character cannot be regarded from the purely local aspect but must be considered from the very broadest aspect of the country as a whole. It is purely a question of the greatest benefit for the greatest number.

One outstanding feature of a grid supply is the relative ease with which a small undertaking can develop and meet fairly large industrial loads without the necessity of meeting heavy capital expenditure by the extension of carbonizing plant, &c. This development can ultimately be of the greatest benefit to the ordinary consumer, since, as I have previously said, there is always a small margin which can be passed on. One concrete example of the combined benefits of centralization and grid gas will serve to illustrate this point. One of our branches was approached for an industrial load which would more than double its output, and the supply was required within a period of 8 to 10 weeks. All question of extension of plant was completely ruled out by both time and cost factors. The question was referred to Castleford and the Distribution Department prepared a complete scheme in conjunction with the West Yorkshire Gas Distribution Company, while the Industrial Department gave advice and help to the works in question. The result was that a satisfactory supply was afforded within the time limit at a price satisfactory to both parties. It would have been impossible for this small Company to consider the supply while working on its old parochial basis, but by grouping and grid gas not only did the small company benefit but the prestige of the Industry generally rose accordingly. Several similar examples could be given.

My experience is such that I can repeat with all confidence what I said in 1928—"that works could be carefully grouped and a process of gradual unification carried out with advantage to both the owner and the consumer, even where the efficiency is high. Such unification and centralization, judiciously carried out, is not only desirable but necessary."

Dr. **G. E. Foxwell** (London) wrote: This Paper, and certain of the comments made during the Discussion thereon, have revealed that there is a very natural tendency on the part of those connected with the Holding Company movement to declare that the future organization of the Gas Industry should be based on that structure. If the Holding Company movement were based strictly on geographical linkages in which larger undertakings assist their smaller neighbours to sell more gas and to reduce its price I should perhaps agree. The history of this movement, however, suggests that (i) some at least of these companies were started in a time of financial and business depression to provide a safe investment for capital; (ii) some gas undertakings have been bought at inflated prices and without any geographical planning; (iii) often an early result of purchase by a Holding Company has been an increase in the price of gas; (iv) most Holding Companies are operated primarily in the interests of the owners of the capital invested; (v) admittedly a great deal of good has resulted even under those conditions in many backward or small undertakings by pooling of technical and sales staff and perhaps by co-operative buying, and in other ways.

In a recent speech to the Institution of Chemical Engineers, Lord Reith, a member of H.M. Government, indicated that in his view public utilities (including coal and transport) should be re-organized as non-profit-making corporations controlled by the representatives of the people on the lines of the B.B.C. and Imperial Airways. It appears to me that whatever may be said in defence of the Holding Company movement, its financial structure is at variance with this type of organization. It seems probable that the Gas Industry as a whole will be so re-organized after the war by compulsion, if it is not re-organized first by internal action; and that the Holding Company movement will be no more than a stepping stone towards the ultimate constitution of the Industry, perhaps based on Lord Reith's views. I should not be in favour of fixing the profits of the Industry at zero, but if the type of organization suggested in my own Paper happened to find favour, capital would bear only a low rate of interest, the Industry being regarded as a gilt-edged investment.

Paper by G. E. Foxwell

Mr. **T. P. Ridley** (Newcastle-upon-Tyne) wrote: I want to confine my remarks to one sentence in the valuable contribution by Dr. Foxwell. On the last line of p. 40 of the Symposium, after referring to the price of gas, Dr. Foxwell states: "This policy will lead to the all-gas house, the greatest single opportunity before the Gas Industry in our generation." This sentence is the only reference to this important subject, and I do not wish it passed by unnoticed.

It follows, as a first step, that we must make the price of gas attractive to the public, so that gas may be used for all heating for domestic purposes. It is of no use to offer gas for water-heating and heating of rooms to be used all day at double the cost of the equivalent services obtained from solid fuel. When the war ceases gas prices will be high, but we shall hope to be able to make reductions eventually. This will be the most suitable time to introduce tariffs. The tariffs should show prices for large domestic consumption which will compete with the cost of local coal supplies. The first 130 or 150 therms need not so compete.

We must then put forward vigorously the advantages of gas water-heating and room-heating—*i.e.* gas for all heating requirements of the house. The great difficulties are (*a*) breaking down the conservatism of the public and (*b*) the cost of the conversion to gas heating. It will take a long time to educate the public, but we need not fear the results. I have not known a line of business in which the results were so unanimously satisfactory to the consumer.

I agree with the Author that the all-gas-heated house is the greatest single opportunity before the Gas Industry, and we should be ready to seize it as soon as practicable. It is hard work, involving long and persistent education of the public, and therefore there is little chance of an undertaking becoming suddenly embarrassed by overwhelming demand, or by its coke-disposal question. It is an attractive proposition.

Mr. **R. Walker** (Manchester) wrote: In considering the post-war reconstruction of the Gas Industry, the Author's comment must be borne in mind, that "The Gas Industry's objective must therefore be to retain its present advantageous service to the consumer, together with a reduction in the relative price of gas, objectives which demand a strong coke and by-products market."

The Gas Industry has undoubtedly paid too little attention to the question of marketing its by-products. It has been content to look upon them as unavoidable, instead of as valuable products which, if properly controlled, would reduce the price of gas into holder even more substantially than in the past. Fluctuations in market demand and consequent price fluctuations make it imperative that there should be greater flexibility so that their effect can be nullified. This can be accomplished by installing plant and processes capable of complete gasification of part of the coal carbonized. A further aim of the Industry must be the production of a satisfactory smokeless fuel that would capture the whole domestic market, by improving the quality of high-temperature coke. The demand for low-temperature coke, and the price it commands, proves that there is a good market for a solid smokeless fuel. Attention should therefore be directed to research on suitable treatment of high-temperature coke.

Greater attention must be paid to tar, the revenue from which has gradually declined. Whatever the future may be, the Gas Industry must not be content to adopt a disinterested attitude. It should concern itself with the search for new and more profitable outlets for its products and an early decision should be reached as to the direction applied research should take. The Leeds process of pressure-hydrogenation of active coke has great promise and the establishment of an economic gasification process would be a decided asset to the Gas Industry.

The Author's remarks in regard to securing the right kind of coal are particularly opportune. Unfortunately, the Gas Industry is only part of the fuel industry and there is a tendency for it to become a victim of circumstances. It has little or no control over the purchases of its chief raw material, coal, on the one hand, and, on the other hand, the sale of its by-products is too dependent upon market conditions. There would appear to be no insurmountable difficulty in a number of undertakings agreeing to take the whole output from the most suitable collieries, thereby eliminating many overhead charges and reducing the running costs. This would provide greater opportunities for blending coals and producing solid smokeless fuels.

Mr. **C. H. Chester** (Swindon) wrote: The future is indeed good, if the Gas Industry will make up its mind what it wants to sell and in what form, and then price its commodities like any other competitor, and according to peak demands. When one reflects that the average domestic load is about 100 therms and could be 500 therms, then works inter-linking and distribution problems must be considered in a new light.

Paper by J. Terrace

Miss **A. M. S. Wilson** (Women's Gas Council) wrote: While I agree with Mr. Terrace that youths training for higher posts should not start specializing too soon, I do feel that something should be done to link up academic education with the student's future work. Although some students may, as Mr. Terrace points out, have spent vacation periods in works, when they come down from the Universities they find they have to get practical instruction in their chosen work, often in competition with boys who have specialized on the practical side since leaving school. The student gets discouraged and sees no hope of using his academic education in the near future; it even appears a disadvantage.

The Universities could help students by giving a series of "specialist" lectures in the last year in addition to ordinary finals work. The course of lectures, not an extensive one, should aim at showing the students how their work fits into the general scheme of education and life. For students intending to enter the Gas Industry, these lectures might deal with the history of the Gas Industry, its relation to science, its place in the life of the nation, in economics and in industry.

Mr. **F. C. Smith** (Gas Light and Coke Company) wrote: It is to be welcomed that prominence is given in this Symposium to education and training, since it is clear that if the Gas Industry is to continue to take its rightful place in the great fuel industry of the country, the calibre, education and training of its personnel are of the utmost importance.

In the Symposium a great deal of attention has rightly been given to the problem of standardization and the co-ordination of fuel

resources. Standardization is a problem bristling with difficulties, but inherent in it is the simplification that it deals with material which lends itself to rigid specification. The educationalist, on the other hand, has not to deal with things but with personalities which have aspirations, undeveloped potentialities and limitations. A truly successful scheme of education must give free play to legitimate aspiration, bring out and direct potentiality, and remove, so far as possible, limitation.

There is much in this Paper which is stimulating and which, in my view, shows not only an appreciation of what is required, but a realization of the difficulties of formulating and working a successful scheme. It is true that a scheme of education sponsored by industry has to follow on and build upon a primary education given in the schools. The tendency has been, as the Author points out, under the national scheme of education to determine at a very early age the type of education considered to be the most suitable for the individual child; thus, when the youth enters industry, it is possible that this early discrimination may be perpetuated, and vitally affect both his usefulness to industry and the development of his own ability. The Author makes it clear that he does not think it possible to make such a rigid classification at so early an age. It is not possible to pass this human material through a three-mesh sieve and "size it up" in much the same way as one can sort out coke.

In fairness I think it is true to say that educationalists have long realized the defects in the present system of selection, but whatever may be done to remedy this evil in post-war educational schemes, any industry scheme must be flexible enough to ensure that students with the necessary ability and a desire to work have every opportunity to qualify, with those who have had the benefit of University education, for the highest posts. It would be fatal, in my view, if young men felt a sense of frustration due to the continuation in business of the effects of an arbitrary selection in their schooldays. As a teacher of some years' experience, I would strongly support the Author's suggestion that industry should endeavour to allow students time during the day to pursue their vocational studies. An excellent start in this direction has been made by some undertakings, but it would be helpful if this could be extended to give similar facilities to those studying for the higher examinations under the scheme. I have many times been conscious, while teaching, that students attending an institution three nights in a week, with the necessity of doing reading at home, are too tired at the end of the evening to assimilate. As the term proceeds, one notices a loss of enthusiasm and has the feeling that the classes are becoming irksome. A scheme which is truly educational must primarily succeed in training the student to think logically, read for himself, and implant a desire to know, for the sake of knowing, as well as to equip him with the means of securing a reasonable standard of living and ability to give useful service to industry.

I agree with the Author that the study of cultural as well as vocational subjects is of the utmost importance to secure that breadth of vision which is so necessary in managerial positions. Such a course would also enable the student to draw from within himself power to spend his leisure in a profitable and enjoyable way. It is difficult for evening institutions, where so much time has to be given to vocational subjects, to develop a corporate life in which students engaged in various courses of study can meet and exchange views. If the concession could be given, or at least part of the vocational subjects be taken during the working hours, it might be conditional upon the willingness of the student to take a cultural subject or subjects in the evening. The present syllabus is long and exacting and often the teacher finds it necessary, in the treatment of ancillary subjects, to limit himself to those aspects which have direct application to the main subject. It is essential, of course, to point out these applications, but the value of a subject, as a means of developing logical thinking, is often lost by the time limitation imposed by evening education. The ancillary subject should not merely be a support to the main subject; it is a means of developing the power of analytical and deductional thinking.

I would make one suggestion—that there should be more frequent conferences between the committees responsible to the Institution for its Education Scheme and the teachers, and that, in common with University procedure, teachers of experience should be consulted in regard to examination questions.

Mr. **C. H. Chester** (Swindon) wrote: On the question of the selection of staff, I think Mr. Terrace is right regarding craftsmen, technicians, and clerical members, but regarding the higher positions, the opportunity to climb the ladder must not be restricted to the "old school tie" or ambition and incentive will be warped. What rung of the ladder would the graduate jump to? This type must see and know how the other fellow does his job in order that he may be able to get a picture of the whole Industry in his mind, without which he cannot direct and will become merely a specialist.

Mr. **J. H. Dyde** (North Middlesex) wrote: As a member of the Board of Examiners of the Institution I was very pleased to be asked to contribute to the Discussion on post-war education introduced with such thought and vision by Mr. Terrace.

Junior education, I submit, cannot be considered in other than its national aspect. The most important development is the raising of the school-leaving age, and this step, I believe, will only bring advantages if cramming for the School Certificate is foresworn. If the present war has proved anything, it has proved the value to the nation of the craftsman. Our junior education of the future, therefore, should be directed just as much to securing a steady flow of young craftsmen to our industries as to producing young professional and so-called "black-coated" workers. The status and position in society of the craftsmen must be enhanced to a degree that parents will be just as keen and proud to put their sons into this walk of life as into offices. Our junior technical schools which are developing craft training should, therefore, be the source of our future gasfitters and works fitters, and our secondary schools, generally speaking, the nursery for our draughtsmen, chemists, technicians and clerks.

As the Author points out, there is much indeed to recommend the provision of instruction by technical and commercial colleges in the daytime, that is, in the employers' time, for, after all, it saves the employer giving the instruction himself, and it is the employer who reaps the benefit of well-trained personnel. Every encouragement should be given to trainees to devote the leisure time thus released to wider reading and to becoming members of such local organizations as literary and debating societies, junior Chambers of Commerce, musical and dramatic societies.

The Institution's present curriculum and examination system, I feel, provides within its framework all the requirements for the technical training of the personnel of the Gas Industry. So far as providing men for the higher posts in the Industry is concerned, there is and always will be an opportunity for those who have been trained within the Industry and at the same time have provided themselves with a liberal education to advance to these higher positions.

In order, however, to attract men with the ability to meet the many diverse qualifications expected of a Chief Executive I suggest that the Gas Industry, through its governing bodies, should offer pupilages to young men of outstanding ability who have graduated in natural sciences or arts at one or other of our greatest seats of learning and culture. The actual course studied is not so important a factor, provided that personality and ability are present and the graduate has been known to make full use of the corporate life of the University. A two-years' pupilage would give the trainee an insight into the working and general organization of the Industry and would enable the Governing Body to assess his aptitude for further development; if this be good, he should be sent to Leeds University for his final and special training in gas engineering to the University's Diploma standard. After such a complete training he need not be more than 25 years of age, and would have taken no longer than a medical student in completing his studies. It is understood that during his pupilage and advanced training he would be in receipt of an adequate allowance to cover his living expenses.

It will be noted that I have referred to the "Governing Bodies" of the Gas Industry as offering these privileges, and in selecting this term I have in mind that post-war reconstruction will bring about group or unified control which alone would enable such a suggestion as I have made to be brought into effect. Such a project would provide a small but continuous flow of able men into the Industry, and the cost of their careful training would, I am sure, be fractional compared with the advantages that would accrue in prestige and capable administration.

Dr. **G. E. Foxwell** (London) wrote: I agree with most of the views put forward by Mr. Terrace on education. There is need in industry for training in management, for management is becoming an art just as complex and just as difficult as the technical handling of plant. The growth of applied psychology has opened fields for management of which many of the older industrialists to-day are of necessity ignorant, and the work of psychologists must be taken into account in training for management. The work that trained industrial psychologists are doing in speeding up production, in reducing fatigue, in improving working conditions, and in bringing about the collaboration of labour in the work of the undertaking is too valuable and vital to be neglected any longer by gas managers. I therefore suggest to Mr. Terrace that in training for management psychology should have its part.

Paper by W. Rupert King

Mr. **W. J. Sandeman** (British Commercial Gas Association) wrote: The Technical Press in its present form serves the Industry in the most efficient way by presenting news and information independently, written from an independent viewpoint by contributors with a full knowledge of the Industry. The existence of three separate periodicals gives the Industry the advantage of opinions expressed independently on the same subject. These opinions need not, and often do not, coincide, while they frequently introduce a new angle of thought. These advantages would be entirely absent from any rationalized Press.

Mr. King's accusation of verbosity and his plea for the publication of abstracts of Papers might possibly be met if the organization submitting the manuscript on behalf of the contributor could arrange to edit it first—of course in agreement with the contributor.

At the beginning of the war the British Commercial Gas Association initiated what was hoped to be a regular series of periodical informal meetings between representatives of the Gas Press and the Association's officers. While pressure of business, air raids, and other factors have rather put this idea in the background, the Association hopes to continue these periodical meetings. This is a step which other organizations might feel inclined to take and thus enable the Press to write articles with a full knowledge of the facts, or to make their criticisms without miscalculation of the policy that lies behind what they are criticizing. It would certainly tend to eliminate much speculation on the part of Editors.

A controlled Press is, I think, undesirable. The Technical Press as an independent entity is a vehicle for the opinions of many members of the Gas Industry who are unable or unwilling to express their views at meetings. Anonymity, for instance, can be preserved in the columns of the Press but not in open meetings. The Press is

performing a valuable service in giving prominence to such opinions, a service which might disappear from a controlled Press.

That the Technical Press is of great value in making interests outside the Gas Industry aware of new technical improvements or inventions, or of new and outstanding installations, is fully recognized by most gas undertakings. It should not, however, be thought that the Gas Press is the only vehicle for such news items. The British Commercial Gas Association has a wide knowledge of likely markets for all information on gas that has a news value, but it must have the material. Perhaps, therefore, I may be allowed to impress upon undertakings (many of them, I know, realize this fact already) the importance of letting the Association have details of new developments and, of course, photographs, as well as sending these to the Technical Press.

Mr. **J. J. Scott** (Cowdenbeath) wrote: As the member referred to by the Author in his opening sentence, I was much surprised to find that my private letter had provided him with material for his Paper. The fact that he has so referred to the subject of my letter suggests at once that the matter is one of some importance to the Gas Industry. While I shall respect the private views of the respective Editors, I should like to say that each of them made out a very good case in support of their retaining their individuality and freedom in the interests of the Industry.

For some long time past, I have observed that, in general, each periodical has within its pages much the same matter, either in full, instalments, or abbreviated, and sometimes spread over three weeks from first publication. This seems a waste of valuable space. There frequently appear contributed articles upon various important matters such as income tax, which merely generalize in such a manner that in point of fact they serve no real purpose. Were the contributors to give more definite detail by means of example, with explanatory notes appended, this would be really helpful. Such financial matters are of as much importance as other technical matters, and deserve to be better treated for the benefit of the secretarial and accountancy interests of the smaller undertakings in particular.

Each periodical creates the impression that it has so much to offer the Industry that it cannot find space, and therefore the readers and the Industry would appear to be the loser. As leaders of thought, the agents of the future policy, the candid critic, the source of encouragement to all, the record of achievement in research, development, progress and the fount of inspiration, the Editorial contributions appear hampered and restricted, to the detriment of the Industry as a whole, because of the lack of space and more probably because of the wide field which each tries to cover.

These are some of the reasons which prompted me to suggest some form of co-ordination, in the hope that it would result in the Press becoming a new and greater force in the Industry. Would it not be possible for one periodical to specialize in matters relating to parliamentary, legal, National Gas Council, Federation of Gas Employers, British Gas Industries, The Institution of Gas Engineers, research work and financial matters; another in technical papers, contributions, foreign reports, association meetings, gas plant improvements, patents, reviews and gas engineering subjects; another to matters of distribution, engineering, sales, gas tariffs, publicity, industrial gas, street and domestic lighting, and all matters relative to gas appliances?

Mr. King refers to private enterprise, competition and attractive advertising facilities being the main factors enabling us to have any Press, but unless co-ordination from within can be obtained the present world conditions may shape the things to come, as indeed it is already doing in many spheres. The Gas Press has a limited circle of purchasers, as well as advertisers, both of whom may yet have to withdraw support, but I suggest that the elimination of competition under co-ordination would not reduce but enlarge circulation. Advertisers would be more appropriately accommodated and would specialize more were they free from the influences which beset them. The field of advertisers might even broaden out, since they could be sure of reaching the reader particularly interested.

Mr. King sees no lack of material in the future and asks whether the Gas Industry would like the Editorial chair to sit in judgment on all available Papers. My view is that the co-ordination scheme would greatly assist in overcoming this point, and also that of peak load to which he refers.

Throughout the Paper one rather senses the tendency to admit the need for some form of re-organization of the Press to deal with the ever-widening sphere of the Industry's life and ramifications. Mr. King deserves every support for his observations under the heading of "A Question of Confidence."

Referring to his comments upon a controlled Press or an official organ, I am opposed to both and only ask for a co-ordinated Press, organized from within, retaining all its freedom, and cutting out all the present overlapping. One "Year Book" in place of three, for instance, would be of equal utility to subscribers and a source of considerable economy to the Press. I recognize the many difficulties —financial and otherwise—to be dealt with and overcome in any scheme upon the lines suggested, but surely private enterprise in the Press is equal to the occasion.

(To be concluded)

WAVERLEY ASSOCIATION OF GAS MANAGERS

The Annual Meeting of the Waverley Association of Gas Managers was held on Friday, June 27, in the Y.M.C.A. Hall, South St. Andrew Street, Edinburgh, Mr. William C. Campbell, Manager of Galashiels Gas Company, President of the Association, in the chair. There was a large attendance.

The PRESIDENT said how gratifying it was to see such a representative turn-out.

"Our last meeting," he continued, "was held under the cloud of eventful happenings on the Continent, but, on this occasion, we meet under conditions which are more favourable to our cause. Our national effort to win the war grows apace and the fighting strength of the nation relentlessly increases. The Gas Industry is indeed entitled to take pride in the part it is playing. Those of us who have not been called upon to stand in the full glare and heat of the 'blitz' methods so ruthlessly employed by the enemy salute our colleagues who have not been so fortunate. We admire their courage and tenacity and they have ably demonstrated the resourcefulness of our Industry.

"The past year has been noteworthy for the difficulties and problems which arose from time to time. If there were such a being as a 'Historian of the Gas Industry' he would not emphasize this fact but would record that the Industry, by courage, resolution, and determination, overcame all difficulties and disasters and proceeded stedfastly on its way. Mutual assistance schemes have already shown the need and value of unification and co-ordination of undertakings. There can be no doubt that it is along these lines that the Industry will direct its efforts in the post-war years.

"We in the Waverley Districts are entitled to record our appreciation of the Mutual Repair Scheme so capably organized by Mr. Jamieson and Mr. Melvin, and this I now formally do."

Mr. R. J. PHILP, North Berwick, Secretary and Treasurer, read the minutes of the last meeting, which were approved.

The Financial Statement, being in the hands of members, was taken as read and was approved.

New Members.—Messrs. J. Webster, Manager, Lockerbie, and W. N. Baird, Manager, Perth, were admitted to membership.

The PRESIDENT said the Committee had decided to nominate Mr. Robert Cowie, junior, Hawick, as President-Elect. He was the son of a worthy father, and was in the third generation of gas managers connected with the Waverley Association. His father was a staunch supporter of the Association, and was extremely jealous of its rights and privileges. It was right and proper that they should honour his son. But their President-Elect did not live only in the reflected glory of his father. He was an enthusiastic and competent gas engineer who had already taken an important part in the affairs of the Junior Association.

Mr. ROBERT COWIE, junior, returning thanks for his election, which was unanimously approved, said he counted himself particularly fortunate to find his lot cast in the Waverley district, which was rich in historical association and also rich in its association with the Gas Industry. It was because of this fact that he found himself coming to the chair at an early age. He was actually in the fourth generation of gas engineers. He appreciated the honour, and with the support of the Committee would do all in his power to carry on the high traditions of the Association.

Mr. R. J. Philp was unanimously re-appointed Secretary and Treasurer, the usual honorarium to be paid.

Messrs. D. D. Melvin, Granton, and I. M. Hardacre, Berwick-on-Tweed, were elected to the Committee for two years, and Mr. A. C. Finnie, Duns, was elected to serve for one year.

Mr. John O'Halloran was re-elected Auditor.

Members were upstanding in memory of the late Mr. Archibald Kellock, Airdrie, and Mr. William Thomson, senior, Musselburgh, to whom the President made appropriate reference, including in his remarks a tribute to colleagues and others who had given their lives in the war.

Thereafter Mr. CAMPBELL gave his Address.

Mr. A. S. NISBET, formerly of Paisley, the Immediate Past-President, handing over the Association Medal to Mr. Campbell, said it was fitting that he should receive this gift. The honour of the Presidency of the Waverley Association had come to him at an early age, so early that further calls would await him, but none would give him greater joy and satisfaction than the call accepted a year ago and fulfilled that day.

Replying, Mr. CAMPBELL said it was a great pleasure to accept the memento from the hands of Mr. Nisbet. If he had succeeded in maintaining the traditions of the Association and the standard set by his predecessors he was amply rewarded.

Mr. R. J. GAVIN, Melrose, proposed a vote of thanks to the officials of the Association for their labours.

Gas Products Prices

The London Market

July 7.

The values of Tar Products in the London Market remain unchanged. Prices are to-day about as follows:

Pitch nominal; creosote 4¾d. to 5d.; refined tar 3¾d. to 4d.; pure toluene under the Ministry of Supply Toluene No. 2 Order is 2s. 5d.; pure benzole is 1s. 10d.; 95/160 solvent naphtha is 2s. 5d. to 2s. 8d.; and 90/160 pyridine 13s. 6d.; all per gallon naked; refined crystal naphthalene £23 per ton in bags; all prices *ex* Makers' works.

The Provinces

July 7.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 10d. to 11d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha North, 1s. 6d. to 1s. 7½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4¼d. to 4¾d.; low gravity, 4¼d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £12 to £15. Salts, 70s. to 80s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 5¼d. to 5½d.; filtered heavy oil (min. gr. 1,080), 5¾d. to 6d.; heavy anthracene oil gr. less than 1,080, 6d. to 6¼d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note in our issue of Sept. 4, 1940, p. 404.

Tar Products in Scotland

GLASGOW, July 5.

Production continues to be well looked after at prices which are steady and in some cases inclined to rise.

Refined tar: Home deliveries are proceeding quite rapidly at the fixed price of 4¾d. to 5d. per gallon, while export supplies are procurable at round 3½d. per gallon, both f.o.r. naked.

Creosote oil: The lighter grades are well sold forward on contract and prices are steady as under: Specification oil, 5d. to 5¼d. per gallon; low gravity, 6d. to 6½d. per gallon; neutral oil, 5¾d. to 6d. per gallon; all *ex* Works in bulk.

Cresylic acid: There is a continued demand for this product in all grades at the following prices: Pale, 99/100%, 3s. to 3s. 2d. per gallon; Pale, 97/99%, 2s. 9d. to 2s. 11d. per gallon; Dark, 97/99%, 2s. 5d. to 2s. 7d. per gallon; all *ex* Works in buyers' packages.

Crude naphtha is valued at round 6½d. to 7¼d. per gallon *ex* Works in bulk, according to quality.

Solvent naphtha: 90/160 grade is 1s. 8½d. to 1s. 9d. per gallon and 90/190 Heavy Naphtha is 1s. 4½d. to 1s. 5¾d. per gallon.

Pyridines are still without interest at about 14s. per gallon for 90/160 grade and 16s. per gallon for 90/140 grade.

Gas Stocks and Shares

Stock markets opened last week in cheerful mood and, although the volume of business was not large, the scarcity of stock caused further all-round gains in prices. But as the week progressed the interest tailed off, and with some profit-taking in evidence prices in a number of directions became irregular. This was not so with British Funds however, which were well supported, some being as many as 2 points up on the week—2½% Consols closing ¾ higher at 81½. Home rails weakened earlier on, although latterly a partial recovery set in. With few exceptions price movements in the industrial market were small in either direction. Leading oil shares were idle and quotations generally were marked down. Rubbers were quiet but steady, and tea shares showed signs of hardening.

There was certainly a keener demand for Gas stocks last week, as is evidenced by the large number of upward movements in the Official List, although here again a shortage of stock, except perhaps in the case of Gas Light units, would account for some of these improvements. The latter were heavily supported and closed 1s. 3d. higher at 11s. 6d. Imperial Continental also recorded a sharp rise of 8 to 50½, business being done at 51 against the previous week's best of 41½. All the South Metropolitan stocks were in demand and the ordinary followed up the previous week's rise of 6 with a further 5 points to 42½, while Wandsworth hardened 3 to 60½. Taking it all round it was the best week for Gas stocks for a long time past.

The following are the full lists of price changes during the week:

OFFICIAL LIST

Alliance & Dublin 4 p.c. Deb. (x.d.)	90—95	June 30
Associated Gas & Water Ord. ...	12/9—13/9	+-/3
Croydon 5 p.c. Deb. (x.d.)	95—100	June 30
Gas Light Units	11/—12/-	+ 1/3
,, 3½ p.c. max. ..	35—40	+1
,, 4 p.c. Pref.	55—60	+2
,, 3 p.c. Deb....	68—73	+1
Imperial Continental	48—53	+8
Mid Southern "C"	67—72	+1
South-Eastern Gas Corporation Ord.	9/6—11/6	+-/6
,, 4 p.c. Pref.	11/—13/-	+1/-
South Metropolitan Ord. ...	40—45	+5
,, 3 p.c. Deb. (x.d.)	65—70	June 30
,, 5 p.c. Red. Deb.	100—105	+2
United Kingdom Gas Corporation Ord. (x.d.)	11/6—13/6	June 30
Wandsworth Cons.	58—63	+3

SUPPLEMENTARY LIST

Croydon 4 p.c. Deb. (x.d.)	75—80	June 30
Malta & Mediterranean 1st Pref. (x.d.)	50—60	,,
2nd Pref. (x.d.)	40—50	,,
Reading 4 p.c. Deb. (x.d.)	70—75	,,
Tottenham 5 p.c. Red. Mortgages (x.d.)	96—101	July 1

PROVINCIAL EXCHANGES

Bristol 5 p.c.	82½—84½	−1½
Weston-Super-Mare 4 p.c. Deb. (x.d.) ...	80—85	June 23
7½ p.c. Deb. (x.d.) ..	135—140	,,

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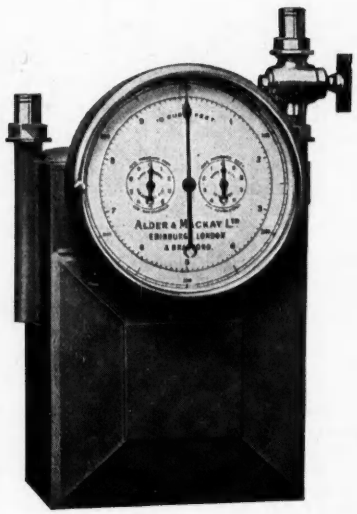

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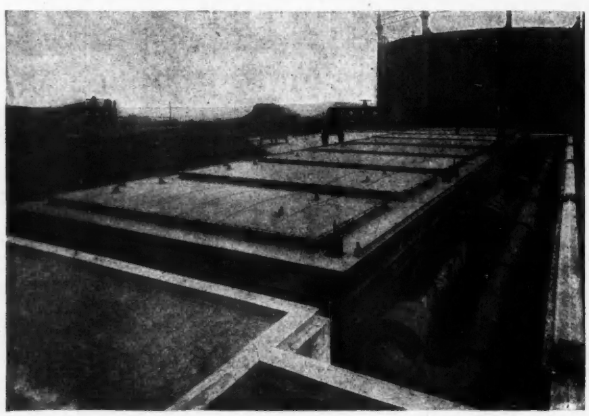

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